AFFIDAVIT OF JAMES E. KEOWN
ON BEHALF OF AMERITECH ILLINOIS
DOCKET NO. 00-0393

I. BACKGROUND

1. My name is James E. Keown. My business address is 1010 N. St. Mary's, Room 1407, San Antonio, Texas 78215. My current title is Regional Manager – Project Management in the Broadband Organization of SBC Communications Inc. and its affiliates (collectively "SBC").

2. I have been employed by SBC for 24 years. My current responsibilities include responding to technical matters, coordinating with Network Planning and Engineering and validating central office jobs and resolving budget-related issues. I also Project Manage the budget for system requirements associated with Project Pronto including for Ameritech Illinois. I have held numerous jobs within SBC, including Network Operations, Transmission Engineering, Maintenance Engineering, and Network Services Staff Support.

3. I have a Bachelor's of Science Degree in Electrical Engineering from the University of Arkansas. I have completed several company training courses in various technical areas such as digital transmission design, central office maintenance, and transmission equipment engineering. I am a Registered Professional Engineer in the State of Arkansas.

II. PURPOSE OF AFFIDAVIT

4. My affidavit addresses some of the costs that SBC would incur if it were to deploy Project Pronto DSL-related facilities in Ameritech Illinois subject to the Illinois Commerce Commission's (ICC or Commission) Order in Docket No. 00-0393. These include costs arising from stranded capacity in the Next Generation Digital Loop Carrier (NGDLC) systems that Ameritech Illinois had planned to deploy as part of Project Pronto. This stranded capacity would be created as a result of the requirement that Ameritech Illinois "unbundle" the Pronto architecture into multiple pieces and allow "collocation" of CLEC line cards in the Pronto NGDLCs. In Docket 00-0393 the ICC ordered Ameritech Illinois to "make available to competitive providers . . . Project Pronto UNEs as follows" if Ameritech Illinois were to deploy DSL-related Project Pronto facilities:

a. Lit Fiber Subloops between the RT and the OCD in the CO consisting of one or more PVPs ("permanent virtual paths") and/or one or more PVCs ("permanent virtual circuits") at the option of the CLEC;
b. Copper subloops consisting of the following segments:
   i. The copper subloop from the RT to the NID at the customer premises;
   ii. The copper subloop from the RT to the SAI ("serving area interface");
   iii. The copper subloop from the SAI to the NID at the customer premises.
c. ADLU line cards owned by the CLEC and collocated in Ameritech Illinois' NGDLC equipment at the RT;
d. ADLU line cards owned by the ILEC in the NGDLC equipment in the RT;

e. A port on the OCD in the CO; and
f. Any combination thereof.[1]

The costs addressed in this affidavit are based on stranded capacity that would be created if Ameritech Illinois were to deploy DSL-related Pronto facilities (including the NGDLCs) and required to implement a., b. and c. As I will explain, these costs would likely run to several hundred million dollars, making Project Pronto economically infeasible in Illinois.

III. DESCRIPTION OF NGDLCs

5. The primary manufacturer of NGDLC equipment for Project Pronto that Ameritech Illinois planned to deploy is Alcatel. The NGDLCs for Project Pronto are designed to employ an integrated combination of software and hardware to perform the functions that allow DSL service to be delivered over the infrastructure. Software at the ADLU line-card level, shelf level, and system level must work together seamlessly to deliver both the DSL and POTS services to the end user customer. The Alcatel ADLU line card deployed in the Project Pronto NGDLCs cannot function without the software and other hardware components in the NGDLC.

[1] Line Sharing Order in Docket 00-0393 at 25.

6. A clear understanding of the technical and physical arrangement of the Project Pronto architecture and deployment is needed to understand the operational issues created by the Order in Docket 00-0393. The Litespan equipment physically has Channel Bank Assemblies (CBAs) and ADLU line cards that plug into slots in the channel banks. Attachment JEK-1 is a picture of an NGDLC. This attachment shows 4 of the possible 9 channel banks in the NGDLC. A typical deployment would have 3 channel banks capable of providing DSL service. Attachment JEK-2 is close up photograph of one of the channel banks. Each channel bank has 56 slots, with each slot capable of supporting 4 ports, or customers, per slot. The remaining slots in the channel bank are used for common equipment, such as power and ringing equipment, required for the ports/customers assigned to the channel bank. Cable pairs are hardwired to the backplane of the channel bank as shown in Attachment JEK-3. These pairs are spliced and distributed to the Serving Area Interfaces (SAIs). Mr. Chris Boyer explains in greater detail the Pronto architecture and the components that make up this architecture in his affidavit.

7. The Project Pronto DSL facilities system that Ameritech Illinois planned to deploy uses an OC3c facility over fiber to transport the DSL service from the remote terminal back to the central office. This OC3c facility has a maximum bandwidth of 155 megabits. The usable bandwidth of the system is limited to approximately 135 megabits. The remaining

20 megabits are used for maintenance and addressing information required by the system. As an analogy, a DS1 has a bandwidth of 1.5 megabits.

8. The ADLU line cards are plugged into the "slots" in the channel bank. The ADLU line card, common equipment and software all combine to provide DSL service over the system. Within the Litespan equipment, Permanent Virtual Paths (PVPs) and Permanent Virtual Circuits (PVCs) are established. A PVP is established for each DSL-capable channel bank to transport the individual PVCs to the CLEC providing the DSL service. To use an analogy, a PVP is analogous to a T1 while the PVC would be equivalent to the individual channels within the T1. Another way to analogize these terms is to think in terms of an interstate highway. For example, Interstate 94 would be the PVP while the individual lanes would be the PVCs. The software in the Litespan dedicates one PVP per ADSL channel bank. Each customer's PVC is assigned to the PVP associated with the channel bank as DSL service is provisioned. The PVP is then assembled with the PVPs from the other DSL-capable channel banks and transported over the OC3c facility to the central office.

IV. NGDLC STRANDED CAPACITY COSTS CAUSED BY CLEC "COLLOCATION" OF LINE CARDS

9. Allowing CLECs to own or designate line cards in Ameritech Illinois' Project Pronto NGDLCs would cause significant, and potentially insurmountable, technical and

operational problems, as Ameritech Illinois' witnesses have explained in this case. Beyond that, however, one of the most serious problems caused by a CLEC owning or designating the ADLU card is the premature exhaust of the port and slot capacity of the NGDLC. Each NGDLC has a limited number of DSL-capable channel banks and thus a limited number of physical slots for ADLU line cards. Based on these limitations, each NGDLC is engineered with enough slot capacity to serve anticipated customer demand in a specific geographic area. As I explained above, each DSL capable channel bank has 56 physical slots. Each slot has cable pairs hardwired to it, with the capacity to serve the maximum number of ports the ADLU card can or will ultimately support.[2] If carriers other than Ameritech Illinois were to own or designate a line card for a particular slot, **all** the ports and associated cable pairs hardwired to that slot would become unavailable for use by any other CLEC. In the case of the Alcatel Litespan equipment, each ADLU line card currently has 2 ports, capable of providing both POTS and DSL service to 2 customers. Alcatel expects to expand the capacity of this card to 4 ports or customers per line card by the second half of 2001. If a CLEC is allowed to own or designate a line card and used that card to serve 1 customer, the other 3 ports and associated copper cable pairs hardwired to the slot would become unavailable to other carriers to serve other DSL customers. As a result, if multiple CLECs were allowed to own and place their line cards in a Project Pronto NGDLC, the NGDLC equipment would exhaust much sooner than if

[2] The maximum number for the Litespan equipment is 4 pairs .

Ameritech Illinois owned all of the line cards. In the latter instance, Ameritech Illinois could rationally manage capacity use, as all of the ports on an ADLU line card could be assigned on a port-by-port basis to different CLECs.

10. The costs estimated in Attachment JEK-4 assume that five CLECs would collocate one line card at each Project Pronto NGDLC that was planned for deployment by Ameritech Illinois. These costs further assume that each NGDLC would serve four Serving Area Interfaces (SAI), which is the point where the copper feeder and distribution pairs are cross-connected. The cost model uses a common nine-channel-bank cabinet configuration, in which power and heat dissipation requirements allow a maximum of only 3 channel banks for providing DSL service. In addition, each CLEC is assumed to be serving only one customer in each SAI using one type of card (e.g., the ADLU card). It is also assumed that no single card serves more than one SAI, due to the design and assignment of the copper pairs in the NGDLC.

11. Based on the above set of assumptions, the CLECs would consume 20 (5 CLECs times 4 SAIs) of the 168 (3 DSL channel banks times 56 slots per channel bank) total slots in the 3 channel banks. This results in 60 of the total 672 ports (168 slots x 4 ports per slot = 672 ports) being stranded.[3] As a result, approximately 9% (60/672) of all ports in the NGDLC would be stranded and unavailable for use by any other carrier. Based on these

[3] CLECs occupy 20 slots times 4 ports per slots equal 80 ports, minus 20 ports used for DSL service equals 60 stranded ports.

numbers and assumptions, an additional 9% capacity would have to be added by Ameritech Illinois to allow continued service for the geographic area for which Ameritech Illinois originally engineered the NGDLC. Using several average cost models for NGDLC and Central Office facilities investment and installation costs, the additional **capital** that Ameritech Illinois would have to expend just to replace this stranded capacity would be $46.3 million.[4] This does not include the associated expense of turning up and testing the additional hardware.

12. The stranded capacity would double if each CLEC served two customers per SAI using two different types of line cards. For example, if one CLEC customer was a residential customer using ADSL and the other was a business using g.sHDSL for symmetrical DSL service, the CLEC would require two slots for the two different types of line cards.[5] Each slot would include four ports, but because each CLEC would be serving only one customer out of each slot, the remaining six ports and the associated copper feeder pairs from the NGDLC to the SAI would be stranded. Based on the same set of assumptions identified above if 5 CLECs are involved, the NGDLC stranded capacity would be 40 slots (or 24% of the total slots) and 120 ports (or 18% of the total ports). The additional **capital** that Ameritech Illinois would have to expend if it were to deploy DSL-related features in Project Pronto NGDLCs would then be $92.7 million to replace the stranded

[4] The cost models are based on some actual and model costs for NGDLC and Central Office work in Ameritech.
[5] This is a purely hypothetical example, of course, as the current Alcatel NGDLCs do not support any line card at this time other than the ADLU.

capacity. These costs, as I stated above, include only **capital** for the additional NGDLCs and central office equipment that would be needed. Again, associated testing and turn-up expenses are not included in this figure.

V. MAINTENANCE AND PROVISIONING SYSTEM ISSUES AND ASSOCIATED COSTS

13. The adverse impact on ordering and provisioning systems and processes for DSL services is another serious operational and cost problem that would arise with a CLEC-owned or designated line card. SBC has developed mechanized flow-through provisioning for its wholesale Broadband Service (which is no longer available in Illinois as a result of the Commission's decisions in this docket and dockets 00-312/313). If Ameritech Illinois were to deploy DSL-related NGDLC features as part of Project Pronto and CLECs were permitted to own or designate the line cards in Ameritech Illinois' DSL capable NGDLCs, a manual verification process would have to be developed and additional resources would have to be put in place to determine whether CBA slots were available to serve the specific geographic area served by the Project Pronto NGDLC whenever a CLEC placed a DSL service order.

14. CLEC "collocation" of the line card also would create additional complexities and challenges in the maintenance and repair process. In the case of the ADLU line card used

in the Alcatel Litespan, and indeed in most NGDLCs, only ADSL service is provided. For CLECs leasing the High Frequency Portions of the Subloop (HFPSL), the CLEC provides only the data service, while Ameritech Illinois would be the POTS (voice service) provider. For end-user customers purchasing DSL service provided over the HFPSL, service problems could occur either in the voice path or the data path. If the ADLU line card needed to be changed, the CLEC would have to provide a maintenance spare to change out the defective line card. Tracking these maintenance spares would place undue responsibility on, and result in significantly increased repair and maintenance costs to, Ameritech Illinois. This would become particularly onerous with multiple CLECs having various types of line cards were to "collocate" them in the NGDLCs. Technicians would be required to identify the owner of the line card, determine whether the owner had provided a spare line card, locate that spare line card, or place a call or order to the owner to provide a spare line card. This more complex maintenance process would create additional service outage time. It also would adversely affect the reliability of lifeline POTS for the end-user customer. These problems either would not exist or would be minimized if Ameritech Illinois controlled the line card. With Ameritech Illinois controlling the line cards, customers could be easily moved from a defective port to a non-defective port.

15. In addition, in order to keep track of both the slots and ports associated with CLEC owned or controlled line cards and to attempt to mechanize the provisioning and

maintenance processes as much as possible, SBC would have to significantly modify many of its back office and OSS–related systems and possibly create new systems. For example, an inventory system would be required to keep track of line card ownership as well as the slot where each card was plugged. Provisioning systems would require modification to prevent assignment of CLEC-A's end-user customers to CLEC-B's line cards. These modifications would have to be designed to eliminate as much manual handling as possible and to reduce delays in the provisioning process. Additional system modifications would also be necessary to assist technicians in identifying the appropriate line card owner and line card type. In addition, these systems would have to track the repair and return process for multiple CLECs, as well as for Ameritech Illinois-owned line cards. Based on previous experiences working with SBC's major OSS-related and back office systems vendor, the costs to develop systems capable of handling the added layers of complexity could be $140 million to $200 million. This cost estimate is validated by the fact SBC spent between $50 million and $70 million for enhancements to it back office and OSS-related systems **simply** to be able to handle the inventorying and provisioning of the NGDLCs it has deployed **without** any "unbundling" or "collocation" requirements.[6] In addition, the development and deployment time for these new and modified OSS-related and back office systems would be in excess of 2 years.

[6] Based on cost to implement SWITCH/DLE.

16. Because of the added operational complexities caused by CLEC “collocation” of line cards and the expectation of increased manual service order handling due to fallout, tracking and maintaining the status of multiple cards for multiple CLECs, additional human resources would be required at various service and support centers. Some of the new functions that these centers would be required to perform would be:

- Build inventories for CLEC-owned line cards and update these inventories as CLECs adds or disconnect DSL customers.
- Maintain database relations between CLEC slots.
- Hire, train and dispatch additional technicians to NGDLC sites to place CLEC-owned line cards. It is reasonable to assume that CLECs will only want to spend their capital dollars (i.e., deploy line cards) when a new DSL customer is obtained. Therefore, Ameritech Illinois would have to dispatch a technician based on some types of service order activity generated by the CLEC. This also would generate additional dispatches.
- Determine the availability of slots in NGDLCs that serve the geographic area requested by the CLECs.

SBC estimates that the additional cost of these human resources would be approximately $ 2.2M in annual recurring expenses for Ameritech Illinois.

<u>VI. NGDLC CAPACITY IMPACT WITH UNBUNDLED LIT FIBER PVPS.</u>

17. As I noted above, one of the requirements that the Commission's Order in Docket 00-0393 would impose on Ameritech Illinois' planned deployment of DSL-capable NGDLCs in Project Pronto would be to "unbundled" the "[l]it fiber subloops between the RT and the OCD in the CO consisting of one or more PVPs…". This requirement would lead to significant problems with stranded capacity if Ameritech Illinois were to deploy DSL-capable NGDLCs as a part of Project Pronto. In order to understand the adverse impact that this requirement would have on the capacity of the NGDLC and the associated costs, one must clearly understand the nature of the DSL-capable NGDLC equipment and facilities that Ameritech Illinois had planned to deploy. The PVP analogy that I mentioned above (the PVP is analogous to a T1 with the PVCs as the individual channels within the T1), is a simplified way to think of a PVP. Another visualization is to think of the PVP as being Interstate 94 between Chicago and Milwaukee with each lane being a PVC. That section of I-94 is dedicated to traffic between Chicago and Milwaukee and there is only one I-94. Likewise, each ADSL-capable channel bank in the Litespan NGDLC has a single PVP dedicated to it. The individual PVCs in the channel bank are mapped to this PVP, which carries a Virtual Path Identifier (VPI). The VPI associates the PVP with the channel bank from which it originates and must have a corresponding termination within the packet network created by the DSL-capable channel bank and the OCD in the Central Office. A PVC from one channel bank cannot be

mapped to a PVP associated with another channel bank. Using an analogy, I cannot take a lane from I-90 and map that lane to I-94.

18. The PVP-related capacity problem created by the Commission's Order is significant. Based on a typical nine-channel bank NGDLC configuration with 3 DSL-capable channel banks, there would be only 3 PVPs available at the NGDLC for DSL service. A CLEC leasing one of these PVPs as a "UNE" would thus take away one-third of the total DSL capacity of the NGDLC. This would also preclude other CLECs from serving customers that would normally be served from the channel bank associated with the PVP. Even worse, the Commission's Order would allow one CLEC to obtain multiple PVPs at an RT site. This could actually happen if one CLEC wanted to serve DSL customers in each of the SAIs served by the NGDLC. To do this would require all three PVPs at the NGDLC (the PVP from each of the 3 DSL-capable channel banks), which would consume the entire DSL capacity of the NGDLC. In that instance, no other CLEC could serve customers in that NGDLC. Said differently, if one CLEC leased the three PVPs to serve one customer in each SAI, all 672 DSL ports in that NGDLC would become immediately unavailable for other carriers. Referring to my I-94 analogy, a CLEC could lease I-94, preventing all other travelers from using the highway. For Ameritech Illinois to replace this capacity, a completely new and separate NGDLC would be required. Again, based on the same cost models that I referred to earlier, if one or more CLECs were to lease PVPs in each NGDLC, Ameritech Illinois would have to spend an additional $519

million or more to build new NGDLCs to make up for the early exhaust of the DSL-capable NGDLCs that it had planned to deploy. In addition, other problems and complications would be created, as it is likely that additional Rights-of-Ways would have to be acquired as well as new easements for placing additional copper to the SAIs. Additional OSS-related and back office system enhancements also would be necessary to eliminate some of the manual handling that otherwise would have to be undertaken by Ameritech Illinois. This would create significant cost burdens for both Ameritech Illinois and CLECs attempting to purchase the Project Pronto "UNEs."

19. In quantifying the above capital costs, I have not even considered numerous other factors that likely would lead to even more cost, such as the fact that in some central offices floor space likely would exhaust and require additional construction due to the added equipment that would be needed in the central offices to terminate the additional NGDLCs. Similarly, I have not considered the additional equipment that would be needed for power and switch terminations, nor have I considered the additional transport equipment that would be necessary.

VII. SUMMARY

20. The various "unbundling" and "collocation" options that the Commission has created for CLECs in its Order in Docket 00-0393 would require Ameritech Illinois to expend, at a minimum between $46.3 million and $519 million of additional capital costs to make up

for stranded capacity. In addition, I conservatively estimate that the additional expense for OSS-related and back office system improvements and additional resources requirements would be approximately $140 million to $200 million. Moreover, because of the wide potential variance in these costs and the high level of uncertainty as to how and to what extent CLECs would make use of the Commission's unbundling requirements for any DSL related Project Pronto NGDLCs that Ameritech Illinois were to deploy, Ameritech Illinois would be unable to budget or provision for its own service needs. Further, while CLECs would not have to invest any of their own capital, Ameritech Illinois would be burdened with the risk of investing an extremely large amount of additional funds (hundred of millions of dollars) without any assurance that it would ever be able to recover its investment. This cost would be added to a product in a market that is already price sensitive. And as CLECs changed their business plans and service plans and as customers change their DSL providers, huge amounts of stranded capacity and investment would be built into Ameritech Illinois' network. Consequently, the ultimate effect of the Commission's Order is to make Ameritech Illinois' planned deployment of Project Pronto DSL facilities economically infeasible.

21. This concludes my affidavit.

FURTHER AFFIANT SAYETH NOT.

James E. Keown

Subscribed and sworn to before me
this 11th day of April, 2001.

Patricia L. Jackson
Notary Public

My Commission expires 1/15/03.

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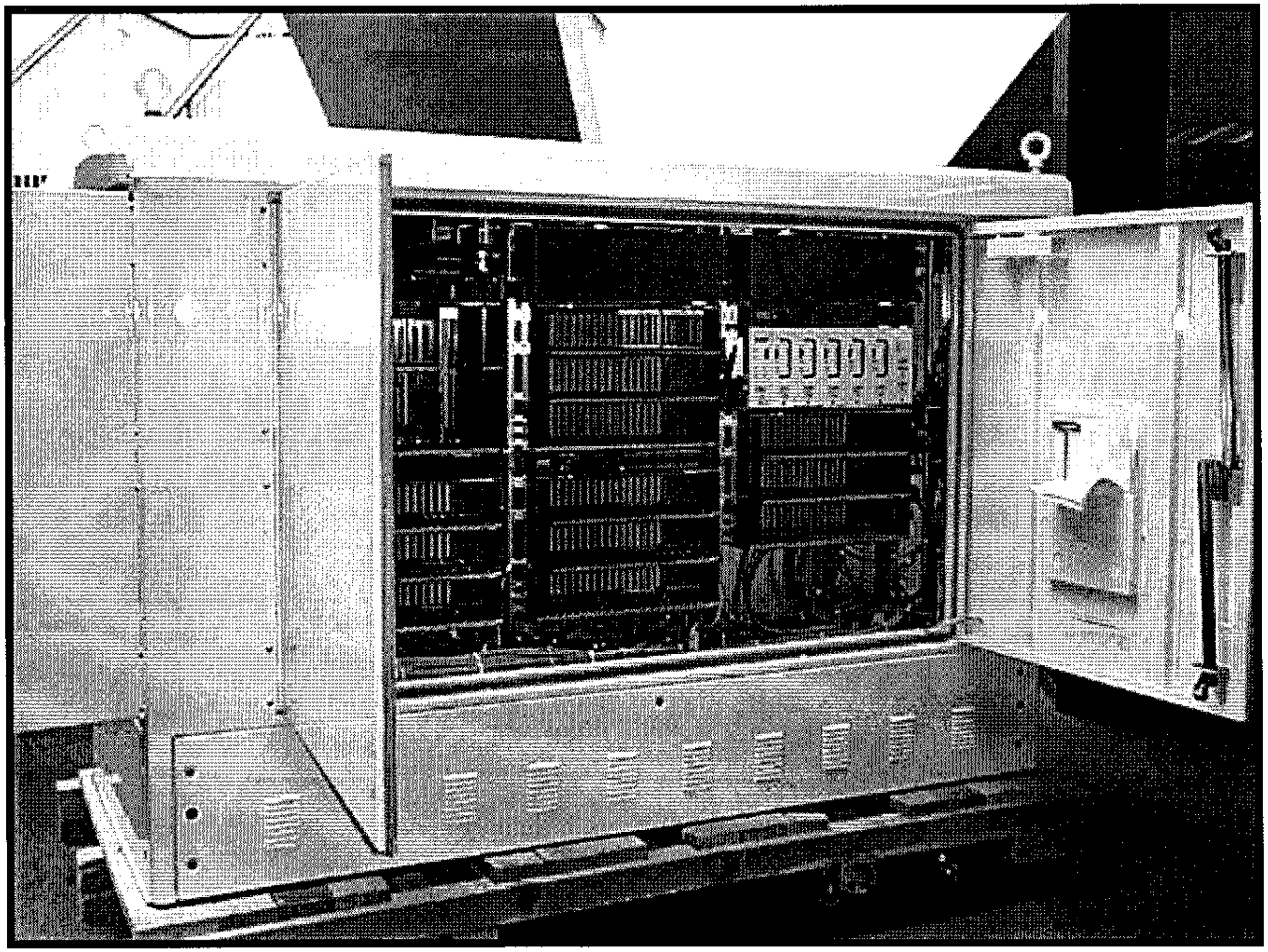

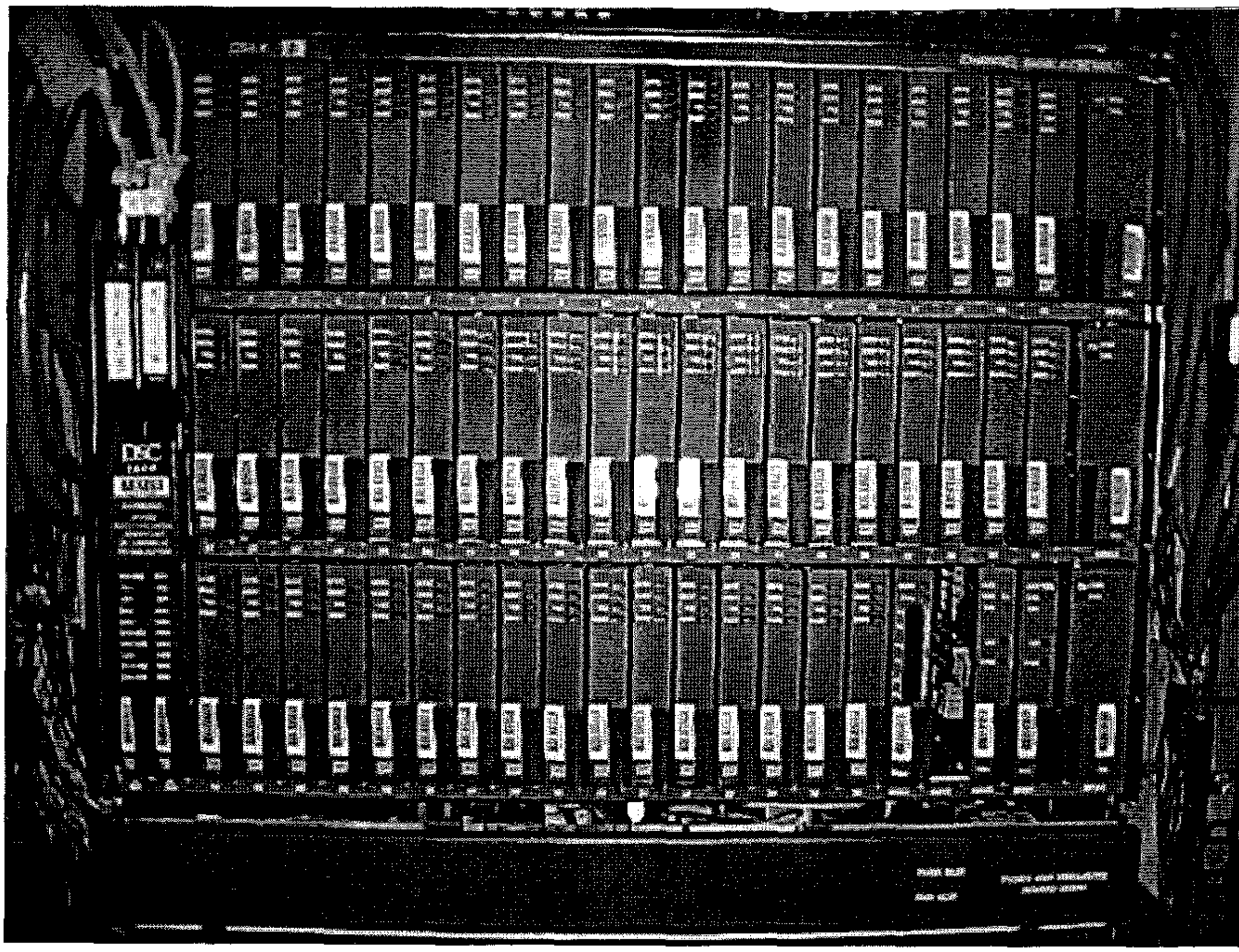

ATTACHMENT JEK-3